

American Potato Journal

Published Monthly by

THE POTATO ASSOCIATION OF AMERICA

East Lansing, Michigan

VOLUME VII

SEPTEMBER, 1930

NUMBER 9

C-O-N-T-E-N-T-S

	Page
Net Necrosis Versus Stem-End Browning in Aroostook Potatoes	251
DONALD FOLSOM	
Potato Production and Marketing Trends.....	256
WM. STUART	
Crop and Market News.....	261
Notes	266
Review of Recent Literature.....	271

Entered as second class matter at East Lansing, Michigan, March 4, 1928, under
Act of March 3, 1879

Accepted for mailing at special rate of postage provided for in section 412, Act
of February 28, 1925, authorized on March 14, 1928.

SUBSCRIPTION PRICE \$1.00 PER YEAR



Ammo-Phos-Ko Makes Potatoes Pay Better

—And after all, it is return on the investment—profit—that the business farmer is looking for. This he gets through using Ammo-Phos-Ko, the complete, compact fertilizer made by adding potash to Ammo-Phos.

To meet every agricultural need where a complete fertilizer is indicated, we now make Ammo-Phos-Ko in *four* analyses. Here they are, and we feel mighty certain that No. 2A will look especially good to the practical potato grower:

Ammo-Phos-Ko No. 1 (Plant-Food Ratio 1-2-1)			Ammo-Phos-Ko No. 2A (Plant-Food Ratio 1-2-2)			Ammo-Phos-Ko No. 3 (Plant-Food Ratio 1-3-1)			Ammo-Phos-Ko No. 4 (Plant-Food Ratio 3-4-3)		
Nitro- gen	Phosphoric Acid	Potash	Nitro- gen	Phosphoric Acid	Potash	Nitro- gen	Phosphoric Acid	Potash	Nitro- gen	Phosphoric Acid	Potash
12%	24%	12%	9%	18%	18%	10%	30%	10%	12%	16%	12%

Note that the plant-food ratio of Ammo-Phos-Ko No. 2A is the same as that of 4-8-8—which is an old favorite with potato growers. But note also that there is more than twice the plant-food in a ton of Ammo-Phos-Ko No. 2A than there is in a ton of a 4-8-8 mixture. That means only half the amount of fertilizer to haul, handle, and distribute. Besides, the plant foods in all of the Ammo-Phos-Ko analyses are of unusual agricultural effectiveness; are well retained by the soil; and sustain as well as stimulate plants through periods of growth and fruiting.



American Cyanamid Company
535 Fifth Avenue
New York

AMERICAN POTATO JOURNAL

PUBLISHED BY

THE POTATO ASSOCIATION OF AMERICA

EAST LANSING, MICHIGAN

OFFICERS AND EXECUTIVE COMMITTEE

John Bushnell, President.....	Ohio Experiment Station, Wooster, Ohio
John S. Gardner, Vice-President.....	University of Kentucky, Lexington, Ky.
H. C. Moore, Secretary-Treasurer.....	East Lansing, Michigan
J. R. Tucker.....	Central Experimental Farm, Ottawa, Canada
E. A. Stokdyk.....	University of California, Berkeley, Cal.

Net Necrosis Versus Stem-End Browning In Aroostook Potatoes

DONALD FOLSOM,

Agricultural Experiment Station, Orono, Maine

Last winter (1929-30) complaints were brought to the attention of the Maine Agricultural Experiment Station about net necrosis and stem-end browning in potato stocks stored in Aroostook county or shipped from there. The occurrence of these internal discolorations was important both to the Aroostook growers and to potato consumers outside of the county. For one reason, it affected a Maine potato crop which was comparatively large and valuable; the annual production of Maine potatoes has come to be usually greater than that of any other state; the annual shipment to the outside is generally greater than that of any other state; and a large part of the state's crop is produced in Aroostook county. For another reason, no one likes to find discoloration inside potatoes, whether the discovery is made during seed-cutting, in the kitchen, or at the dining table. Further, the appearance of the two troubles at the same time was interesting and puzzling because of its rarity in Aroostook county—it had occurred in the 1923 and 1927 crops in Maine outside of the county.

As indicated above, internal discoloration gave rise to complaints based upon the appearance of the affected potatoes when cut. A further effect was reported to be the refusal of some lots in commercial transactions, sometimes with justification on the basis of examination by official inspectors who pronounced against discoloration extending deeply enough to be still apparent when about 5 per cent of the tuber had been sliced off. Even

exclusive of the question of grade, fear sometimes was expressed as to the value of affected tubers and stocks for seed purposes.

In view of the confusion and doubts apparently existing in the minds of many of those concerned, it seemed desirable to repeat tests of affected potatoes as made in previous seasons. These tests and other evidence to date show that net necrosis and stem-end browning are two kinds of discoloration with different causes. It seems desirable to distinguish between them here, for the benefit of the readers of this periodical who may be interested.

Net Necrosis

The term "net necrosis," like many other terms, is most valuable when used with its history in mind and with an understanding of the cause and effect of the malady referred to. The first use in a publication was by Orton in 1914 (15, Pl. II and p. 14) who credited Wollenweber with having suggested the name. Orton presented an illustration, described the discoloration in the text, and stated that the cause was unknown. Dr. E. S. Schultz, working under Dr. Orton, and the present writer together (18; 3) in 1921 presented evidence that net necrosis is a symptom of leafroll, one of the degeneration diseases (potato virus diseases or viroses), under certain conditions. Work by Gilbert in Vermont was being done at the same time and led independently to the same conclusion (8; 4). The same is true of observations by Kasai in Japan (10, p. 52).

Later publications (19, p. 54; 6; 7; 5; 16) increased the evidence that net necrosis as described by Orton is a leafroll symptom under certain conditions. Of special interest is the report by Quanjer and Elze (16) based on observations (in Holland?) showing that net necrosis could occur in Green Mountains as the result of the spread of leafroll to them from nearby plants of Dutch varieties, which do not show this symptom of leafroll. This report, together with an accompanying account (17), should complete a satisfactory disposition of Atanasoff's effort to prove that "net necrosis is a tuber symptom, not of leafroll, but of *Aucuba mosaic*" (1), especially since Atanasoff's observations were made in Quanjer's laboratory, presumably on material available to Quanjer and his associates. Net necrosis has been studied most thoroughly by Gilbert, especially with respect to the microscopic changes involved. A student of the problem will do well to obtain a copy of the recent summary of his results (Vermont Agricultural Experiment Station Bulletin 289).

With this background, net necrosis may be defined as an internal discoloration of potato tubers, due to leafroll, and typically extending from the stem-end scar as brownish strands for an inch or more in several zones or circles. The brownish color

is due to the necrosis or death of phloem (food-conducting) strands, which explains a frequent association of spindling sprouts with net necrosis. The "net" effect is best seen when part of the face, rather than of the extreme stem end, is sliced off. When the tuber is sliced across, the brownish strands often appear as short lines or dots.

Although typical net necrosis can be defined and described thus, modifications and variations are known, as with anything in nature. These can be learned best from the literature already cited. It should be emphasized here that leafroll causes net necrosis only under certain conditions—in certain varieties, in tubers produced by plants growing from healthy seed and infected with leafroll during the growing season, and after some weeks or months in storage. Even with these conditions suitable, tubers vary, many carrying leafroll of recent infection without developing net necrosis.

From the preceding it will be seen that the control of leafroll will control net necrosis. On the other hand, the discarding of net-necrosis tubers will not eliminate all leafroll, though the presence of net necrosis can serve as a warning that leafroll is being perpetuated in the stock following its spread to some or all of the parent plants of the previous growing season.

Stem-End Browning

Turning now to "stem-end browning," the term was used at least as early as the term "net necrosis" by Orton who referred to a "stem-end browning due to *Fusarium*" (15, Pl. II). "Stem-end browning," in the broadest sense, might be considered to include all such discoloration due to fungi, bacteria, degeneration diseases (including leafroll), strictly physiological and environmental causes (including low temperature), and unknown causes. In Maine, however, *Fusarium* wilt is unknown, *Verticillium* wilt has become rare, bacterial vascular discoloration is rare, though resulting occasionally from blackleg, and frost necrosis when occurring is readily recognized by the blotch and leaker injury associated with it. As a result, the term "stem-end browning" has come, in Maine, to mean "stem-end browning due to unknown causes," and is used in that sense in this article. A shorter term than the latter, or a short term that is more precise than "stem-end browning," is desired, but does not seem to be available. After all, when used consistently in an accepted sense, the term "stem-end browning" will not be more confusing than various other common names of diseases that are hard to describe in simple phrases.

Stem-end browning with no known cause has been described from different regions during the last decade by various investigators, including Edson (2), McKay (13; 11, p. 438; 12), Weniger

(20), Goss (9), Morris (14), and Gilbert (5, Pl. IV). These investigators and the present writer discovered this phenomenon while attempting to distinguish between healthy tubers and either wilt-infected or net necrosis tubers. Whereas it appears to be hopeless to try to distinguish clearly between the former two, it is possible to distinguish in nearly all instances between net necrosis and stem-end browning in Maine potatoes.

All tests to date show no apparent effect on vine vigor or on yield from stem-end browning, and no perpetuation from one generation of tubers to the next. The trouble seems to be seasonal in any one region, regional in any one season, and not inherent in any strain or stock. It should be distinguished as far as possible from net necrosis, and should not be the basis of discrimination against Aroostook seed stocks in which it is found, at least until some evidence has been secured to justify such discrimination.

Practical Distinction

It is not claimed that a correct distinction can be made in the instance of every individual tuber. As through most phases of nature, there is an intergradation that baffles our desire to classify easily and distinguish clearly. However, it is of interest that of tubers planted this spring, by the writer, as having net necrosis, over 99 per cent produced plants with leafroll.¹ Other tubers which were in part from the same seed stocks as the net necrosis tubers, were planted in the same test as having stem-end browning and not net necrosis. Of these, only 6 per cent produced plants with leafroll, a percentage about like that in check plants from nondiscolored tubers, and a percentage low enough to show that stem-end browning could be practically distinguished from net necrosis in nearly all individual tubers. In this test a few tubers were planted as probably having net necrosis, and three-fourths of these produced leafroll plants.

The chief use that is proposed for the distinction is not between tubers, but between stocks of seed potatoes. If discoloration is cause for complaint, usually enough tubers can soon be examined to determine whether or not net necrosis is present, especially during the second half of the winter season. Usually stem-end browning does not extend into the tuber as far, or in as many zones, as net necrosis. When it does in some tubers, there are all degrees of browning in the stock up to the stage that is severe enough to be confused with the milder stages of net necrosis. Further, if net necrosis is present in any quantity some unmistakable cases can be expected which are more severe than any stem-end browning. Here, as in many potato problems, some experience and judgment are desirable. Also, it is of course helpful in making a decision to have a record of the leafroll percentage for the field the preceding season, although on

the one hand healthy fields may be invaded by the disease, or on the other hand the disease may not spread when present.

Among Aroostook potatoes, Irish Cobblers and Spauldings (Rose 4) show net necrosis only rarely, if indeed the former does at all, even when all the conditions, including the spread of leafroll, are like those which produce net necrosis in Green Mountains. That is, discoloration in potatoes of the Irish Cobblers and Spaulding Rose varieties can be attributed generally to stem-end browning. Even in Green Mountains grown in Aroostook county, the records to date show that stem-end browning is more common than net necrosis.

(1) **Atanasoff, D.** Net necrosis of potatoes. *Phytopathology* 16:929-940. 1926.

(2) **Edson, H. A.** Vascular discoloration of Irish potato tubers. *Jour. Agr. Res.* 20:277-294. 1920.

(3) **Folsom, Donald.** Potato leafroll. *Maine Agr. Exp. Sta. Bul.* 297. 1921.

(4) **Gilbert, Alfred H.** Correlation of foliage degeneration diseases of the Irish potato with variations of the tuber and sprout. *Jour. Agr. Res.* 25:255-266. 1923.

(5) **Gilbert, Alfred H.** Net-necrosis of Irish potato tubers. *Vermont Agr. Exp. Sta. Bul.* 289. 1928.

(6) **Gilbert, A. H.** Net necrosis of the potato. *Phytopathology* 17:555-561. 1927.

(7) **Gilbert, Alfred H.** Production of potato tuber necrosis. *Science* 67:464-465. 1928.

(8) **Gilbert, Alfred H.** The correlation of foliage-degeneration diseases of the Irish potato with variations of the tuber and sprout. (Abst.) *Phytopathology* 12:40. 1922.

(9) **Goss, R. W.** Relation of environment and other factors to potato wilt caused by *Fusarium oxysporum*. *Nebraska Agr. Exp. Sta. Res. Bul.* 23. 1923.

(10) **Kasai, Mikio.** Observations and experiments on the leafroll disease of the Irish-potato in Japan. *Ber. Ohara Inst. f. Landwirtsch. Forsch.* 2:47-77. 1921.

(11) **McKay, M. B.** Further studies of potato wilt caused by *Verticillium albo-atrum*. *Jour. Agr. Res.* 32:437-470. 1926.

(12) **McKay, M. B.** Potato wilt and its control. *Oregon Agr. Exp. Sta. Bul.* 221. 1926.

(13) **McKay, M. B.** Transmission of some wilt diseases in seed potatoes. *Jour. Agr. Res.* 21:821-848. 1921.

(14) **Morris, H. E.** Field wilt (*Fusarium*) of potatoes. *Montana Agr. Exp. Sta. Bul.* 184. 1926.

- (15) **Orton, W. A.** Potato wilt, leaf-roll, and related diseases. U. S. Dept. Agri. Bul. 64. 1914.
- (16) **Quanjier, H. M., and D. L. Elze.** American and European leaf roll of potatoes. (Abst.) *Phytopathology* 20:137. 1930.
- (17) **Quanjier, H. M., T. H. Thung, and D. L. Elze.** "Pseudonetnecrosis" of the potato. (Abst.) *Phytopathology* 20:137. 1930.
- (18) **Schultz, E. S., and Donald Folsom.** Leafroll, net-necrosis, and spindling-sprout of the Irish potato. *Jour. Agr. Res.* 21:47-80. 1921.
- (19) **Schultz, E. S., and Donald Folsom.** Transmission, variation, and control of certain degeneration diseases of Irish potatoes. *Jour. Agr. Res.* 25:43-117. 1923.
- (20) **Weniger, Wanda.** Studies on the causes of stem-end discolorations of potato tubers in North Dakota. (Abst.) *Phytopathology* 13:55. 1923.

Potato Production and Marketing Trends¹

WM. STUART,

United States Department of Agriculture, Washington, D. C.

Economic conditions are making it necessary for the producer of food stuffs to recognize the necessity of applying the same business principles in farming as have been developed and adopted by large industrial corporations. It does not require any very keen observer to note the change in farm practices that have been made in the past decade nor any supernatural insight into the future to be able to visualize the still greater changes that will take place in the next ten years.

The mechanization of farming operations has become an actual fact on a number of farms and you are to be congratulated that on some of your Long Island farms the horse has been superseded by the tractor and other motorized implements and conveyances. Just how far horse power can be displaced by tractor or automotive power remains to be seen but I have faith to believe that in the very near future we may confidently expect a very decided shift in this direction.

But why all this discussion about the type of power employed on the farm?

¹Paper read at evening session of 13th Long Island Potato Tour, June 26, 1930.

My answer is that future progress in the more economical production of any raw foodstuff is to a large extent dependent upon the saneness of application and use of mechanically operated farm equipment. The cutting down of man and horse labor through a larger use of tractor or other motive power and the employment of modern farm implements becomes, under proper management, a much more efficient method of producing farm crops.

In the case of the potato the tractor permits of deeper plowing and the use of larger and heavier implements in the preparation of the seed-bed with a consequent reduction in cost of labor. The tractor also has sufficient power to haul as many potato planters as may be conveniently used and operated. The same is true with respect to the cultivation of the crop. Three two-row cultivators may be attached and thus handle six rows in one operation. Similar efficiency can also be secured in spraying the crop. One man with a tractor can operate, on reasonably level ground, an 8, 12 or even a 16-row sprayer. The saving in time and in vine injury to the plants as a result of fewer trips is in itself an item of very considerable economic value. In the harvesting of the crop it has been found feasible to operate from two to four diggers with the tractor.

The autotruck furnishes a quick, and satisfactory means of transporting the crop from the field to the shipping point or to the storage house as the case may be.

The economic production of potatoes is thus seen to have as one of its basic factors the possession and use of an abundant and cheap source of power coupled with efficient labor-saving equipment.

The important factors in the production of a maximum crop of potatoes are generally accepted to be:

1. Deep and thorough preparation of the seed bed.
2. An abundance of available plant food.
3. Good seed used liberally.
4. Pre-germination tillage.
5. Good cultivation.
6. Thorough protection from insect and fungous injury through the use and timely application of insecticides and fungicides.

The harvesting, handling, grading, storing and marketing of the potato crop is in a sense a distinct phase of potato production, while in another sense it may be regarded as entirely apart from it in that it is not concerned with the production end. Nevertheless, it is perhaps the most important part of the industry because it deals with the money aspect of it. Strictly speaking we might call it the revenue end of the business. Whether this

revenue is sufficient to offset production costs and leave a satisfactory profit to the grower is oftentimes determined by the manner in which the crop is harvested, handled, graded, stored and marketed. I am satisfied in my own mind that in some one or all of these operations there is unnecessary waste. It is this phase of commercial potato production that I would like to briefly consider with you in order that we may arrive at some workable plan of reducing wound injuries in harvesting and handling the crop.

I wonder if any of you have attempted to select exhibition tubers, in the field or in the bin, from stock harvested with the elevator type of potato digger. Generally speaking, it is bad enough in the field, and is almost hopeless from the bin. For some reason we have been content to tolerate such injuries to the crop, assuming possibly, that they were inevitable. I am convinced that sooner or later careful studies will be conducted to determine the least objectionable and most practical type of digger, as judged by the per cent of injured tubers, that is now manufactured. Studies will also be made as to the best method of operating a digger to minimize tuber injury. Furthermore, it is our candid belief that in the near future a more careful consideration will be given to the selection of the land on which the crop is to be grown. Soil containing many small stones will to a large extent be avoided by those wishing to produce a crop which will grade a high per cent of U. S. No. 1 or better. Similar studies will be made relative to injuries resulting in rough handling of the tubers either in picking them or in the grading and handling of the crop. There is no need to discuss the matter in detail, we all recognize that in many instances rough handling is responsible for a considerable amount of injury. The ideal way is to use wooden bushel crates in which to pick and transport the crop to the grader or the storage cellar.

In grading potatoes of which a large per cent of the tubers have sustained a certain amount of mechanical injury there is a stronger temptation to allow a large number of them to pass as No. 1's than in the case of a lot of which only a few have been injured. In other words stock reasonably free from mechanical injuries is much more likely to be properly graded than when the reverse conditions obtain.

My object in discussing this particular phase of the potato industry as well as the subject of more economical production is to direct attention to the increasing competition from western-grown potatoes in our eastern markets.

For the past two or three years it has been possible to watch the increasing volume of western potatoes marketed by Washington chain stores. In the winter of 1928-29 Idaho Russet Burbank potatoes (Netted Gem) were retailed by the chain stores

Number of Car Unloads in Eastern Cities of Western-Grown Potatoes in 1927, 1928 and 1929

City	Colorado			Idaho			California			Montana		
	1927	1928	1929	1927	1928	1929	1927	1928	1929	1927	1928	1929
Akron.....												
Albany.....		5		7	38	36						
Baltimore.....					3	3						
Boston.....				1	30	8						
Bridgeport.....				8	2	30						
Buffalo.....					13	12						
Chicago.....	1	562	1068	10	4091	3870				1		
Cincinnati.....	578	4	60	327	466	522				105	113	45
Cleveland.....	10	163	3	98	268	225				4	8	7
Columbus.....	151	5		15	32	48				20	21	6
Dayton.....	2			38	72	97				1	3	7
Detroit.....			6	80	74	98				3	17	
Evansville.....	29	114	18	11	40	2				6	14	
Grand Rapids.....				1	7	24						
Hartford.....				1	12	9						
Indianapolis.....	2	5	14	55	71	61				1	3	6
Milwaukee.....	62	69	19	77	194	202				1	24	
Newark.....				3	3	28						
New Haven.....					7	3						
New York.....	3	2		76	261	384						
Peoria.....	11	5	6	13	34							
Philadelphia.....				3	304	168					4	
Pittsburgh.....	1	1	1	22	208	88					19	
Providence.....				2	9	2						
Richmond.....					3	2						
Rochester.....					6	3						
Springfield.....					23	6						
Syracuse.....					91	9						
Terre Haute.....	18	3		19	8	8						
Toledo.....		1		10	107	105						
Washington.....				31	3	5						
Youngstown.....	2			3	17							
	877	940	1195	4194	5494	6062	7	23	24	122	234	72

Number of Car Unloads in Eastern Cities of Western-Grown Potatoes in 1927, 1928 and 1929

City	Oregon			Utah			Washington			Wyoming			Nevada		
	1927	1928	1929	1927	1928	1929	1927	1928	1929	1927	1928	1929	1927	1928	1929
Akron.....															
Albany.....							6					1			
Baltimore.....															
Boston.....															
Bridgeport.....															
Buffalo.....	2	4	4	6	11	27	45	115	2	16	55	77			
Chicago.....								16			4				
Cincinnati.....			1			3	4	27		1		2			
Cleveland.....								11							
Columbus.....								7							
Dayton.....			3			2		88				1			
Detroit.....								1			1				
Indianapolis.....															
Milwaukee.....															
Evanville.....		2	1			2	3	3							
Grand Rapids.....		1	1			2	1	6		3	1	19			
Hartford.....															
Newark.....					2										
New Haven.....															
New York.....															
Peoria.....		1			1	1	1	1							
Philadelphia.....					1										
Pittsburgh.....						4									
Providence.....															
Richmond.....															
Rochester.....															
Springfield.....															
Syracuse.....															
Terre Haute.....										1					
Toledo.....															
Washington.....															
Youngstown.....															
	2	8	10	6	14	41	54	289	8	21	62	99			

at 35 cents for 10 pounds, whereas eastern-grown Green Mountains and Rurals were being retailed over the same counter at 25 cents for 15 pounds. In other words, western-grown Russet Burbanks were bringing 3.5 cents per pound while Green Mountain and Rural were being sold for 1 2/3 cents per pound. During the past winter the retail price of western-grown Russet Burbanks has been approximately 5 cents per pound, while eastern-grown stock sold for 3 to 3.5 cents per pound. The interesting feature of this marketing situation was the fact that the buying public was more than willing to pay this more than 100 percent difference in price in 1928-29 in order to get quality product. Perhaps this attitude of mind is best exemplified in a consular report recently submitted from Vancouver, B. C., in which is included the findings of a member of the British Columbia Committee of Direction on the Compulsory Cooperative Marketing Act, who was delegated to investigate the reason or reasons for Vancouverites preferring American potatoes to those grown in British Columbia. He says among other things,—“Yakima potatoes are more strictly graded than the British Columbia product. They are of a more even and dependable quality. In other words, if a housewife buys 10 pounds of Yakima potatoes she gets 10 pounds of potatoes that she can use. When she buys 10 pounds of British Columbia potatoes she gets something less than 10 pounds that she can use. She wants quality in her potatoes, she is willing to pay for quality and turns where she can get it.” What a testimony we have here as regards the attitude of the consumer to quality of food desired when obtainable.

As long as there is a sufficiently wide margin between the retail price of western and eastern-grown potatoes to more than offset the freight differential we may expect to have an increasing volume of western-grown potatoes disposed of in eastern markets in direct competition with eastern-grown stock.

Crop and Market News

Crop Prospects Reduced

(Contribution from Bureau of Agricultural Economics)

Decreasing shipments during late July and early August, and rumors of serious damage to the potato crop from the prolonged heat and dry weather, helped to strengthen the market situation. Prices were down to a low level just prior to August 1, but soon began to react. By the tenth of the

month, central and northern New Jersey points had advanced to \$1.85 per 100 pounds of best sacked Cobblers. Kaw Valley, Kansas, movement was about completed and f. o. b. prices in that district were up to \$1.50. Terminal markets also were considerably higher. With a short crop of potatoes this season and a very light crop of sweet potatoes, a good distribution should be effected, and present prospects are for rather favorable prices.

Potato prospects were reduced more than 6% during July by the heat and drought that was general over the eastern half of the country. Condition of the crop declined from 83% of normal on July 1 to 76% on August 1. This season's production is now indicated to be less than 373,000,000 bushels, which would be only 3% larger than the short 1929 crop and 5% below the average production of the preceding five years. It looks as if production may average about three bushels per capita.

The loss in yield prospects during the month was particularly sharp in a belt from Nebraska and the Dakotas through to Pennsylvania, Maryland, and Virginia. In the North Central States the expected yields on August 1 were only 11% above the low average yield of 1929 and 6% below the average of the years preceding. Later reports from a number of these States show that further loss in yields had occurred during the first week in August, which may reduce the August 1 forecast by as much as 8,000,000 bushels. Local rains during the same period in some other important areas helped the crop, but ample moisture was still wanting. Conditions in New Jersey, New York and New England continued to indicate better than average yields, except in Aroostook County Maine, where yields are now expected to be slightly below average because of excessive rains. In the western States, yields are expected to equal those of last year, although slightly under the 10-year average. The South Atlantic States will likely have the lowest yield since 1914 and the South Central the lowest since 1927.

The losses in expected production during July amounted to 7% in the 19 surplus-producing States, and more than 8% in the 16 deficient States. Production in the southern States was estimated to be 11% greater than in 1929. The production forecast on August 1 was 261,442,000 bushels for the surplus States, 74,782,000 for the deficient States, and 36,333,000 for the southern group.

The 16 largest producing States together, according to August forecast, expect 283,551,000 bushels of potatoes, compared with 268,527,000 in 1929.

The following table gives figures by States:

ESTIMATED PRODUCTION IN IMPORTANT STATES

(States having 7,000,000 or more bushels of potatoes)

STATE	1930		1929		STATE	1930		1929	
	Bushels	Bushels	Bushels	Bushels		Bushels	Bushels	Bushels	Bushels
North Carolina..	8,291,000	8,130,000	Michigan	26,037,000	18,410,000				
Virginia	13,912,000	17,461,000	Wisconsin	25,338,000	20,240,000				
New Jersey	7,905,000	6,032,000	Minnesota	27,810,000	27,370,000				
Missouri	8,265,000	5,508,000	North Dakota	7,750,000	6,960,000				
Maine	44,180,000	50,120,000	Nebraska	7,912,000	8,924,000				
New York	31,270,000	24,840,000	Colorado	11,610,000	12,320,000				
Pennsylvania	24,308,000	25,740,000	Idaho	21,645,000	17,136,000				
Ohio	7,770,000	10,656,000	Washington	9,548,000	8,680,000				

Movement of the first crop from Eastern Shore of Virginia was closing with a record of 17,000 cars, or just about the same as a year ago. The Norfolk section shipped 3,700 cars, or considerably more than in 1929. Eastern Shore of Maryland was credited with 2,050 cars by August 10, and expected only light additional shipments. Final movement from Kansas was expected to be at least 3,600 cars, as against 2,440 in 1929, and Missouri looked for a total of fully 2,000 cars, or more than twice as many as last season. In mid-August, New Jersey was furnishing nearly half the carlot shipments of potatoes which then averaged only 400 cars daily. Considerable quantities were moving by motor truck. Shipments were gradually becoming active in the northern tier of States in western producing districts.

Prices were advancing during the middle of the month, partly as a result of the decreased crop report. City dealers were getting \$3.25-\$4 per barrel of best Eastern Shore Cobblers, while sacked New Jersey stock ranged \$1.65-\$2.25 per 100 pounds, and Long Island Cobblers brought \$1.60-\$1.85 in New York City. The Chicago carlot market reported mid-western Cobblers at \$1.75-\$1.85, Minnesota Early Ohios at \$1.60-\$1.75, and Colorado and Idaho Bliss Triumphs at \$2.40. Wisconsin stock sold at \$2. Kentucky Cobblers brought \$2-\$2.25 in Cincinnati.

Supplies were expected to be rather moderate until digging of the main crop in important late States. All signs pointed to favorable markets for at least several weeks.

New England Crop Reporting Service, Aug. 13, 1930

Conditions to August 1 indicated a United States potato crop totalling 372,557,000 bushels compared with 398,419,000 bushels, the outlook a month ago, 359,796,000 bushels harvested last year and 392,605,000 bushels the average production of the five years 1924-1928. This prospective crop is 3.5%

greater than the crop harvested last year but 5.1% less than the recent five year average. Severe drouth in many of the middle western states together with wet weather in Maine is largely responsible for the decline in prospects.

In New England the potato crop is expected to total 52,955,000 bushels compared with the indicated production a month ago of 55,630,000 bushels, 58,988,000 bushels harvested last year and 47,400,000 bushels the five-year average production of 1924-1928. Conditions have been quite favorable to the growth of potatoes in southern New England but less favorable in northern New England where rainfall has been too heavy and temperatures too high for potatoes to make a healthy growth.

The Maine potato crop is estimated at 44,180,000 bushels, 12% less than harvested last year but nearly 15% above the five-year average. In Aroostook County the potato crop does not present a very satisfactory appearance. A few fields have already blighted badly and many others show evidence of some blight. Heavy showers have been frequent and temperatures generally high. The heavy showers have also washed out gullies in some fields and caused the fertilizer to leach out badly. The final outturn, however, is very dependent on weather conditions during August.

Potato prospects in the eight major late crop states (Maine, New York, New Jersey, Pennsylvania, Michigan, Minnesota and North Dakota) declined 8% during July and are now expected to be 8% more than the light crop harvested last year but nearly 6% below the five-year average for these states. The outlook in the twelve minor western surplus states is quite similar to that of the major states. In the twenty late surplus states the outlook is for a crop nearly 8% greater than harvested last year but about 4% below average.

A particularly light crop is expected in the fourteen late deficient states the most important of which are located in the Ohio Valley where the drouth damage has been greatest. In this group the outlook was reduced 9% during July and production is expected to be about 13% less than in 1929 and 18% below average. This situation will tend to increase the carlot movement of potatoes from surplus areas.

In New York the potato crop made good growth until late July when it was checked by the hot dry weather generally prevalent over most of the state. On Long Island, however, the potato crop is making excellent yields, the digging of the Cobbler crop being already under way. In Pennsylvania the crop has been damaged by drouth which is serious over three-fourths of the state. To date the Lehigh Valley has escaped

serious damage. Early potatoes yielded quite well generally but late crop prospects are very discouraging.

The other important surplus states, Michigan, Wisconsin, Minnesota, and North Dakota, have been damaged by drouth and high temperatures to a limited extent. The early crop in these states will be light while the final outturn of the late crop is rather uncertain and largely dependent on weather conditions during August. In Idaho most of the potato crop is grown under irrigation and, therefore, escaped drouth damage.

CERTIFIED SEED POTATO ACREAGE 2% LESS THAN IN 1929

Reports from the inspection officials in the northeastern states and provinces indicate that 44,326 acres of potatoes have been entered for certification this year compared with 45,169 acres entered last year and 63,367 acres entered in 1928. Comparatively small changes are shown in most of the states and provinces. Acreage decreases of 16% in Maine; 21% in Vermont; 9% in New Brunswick and Nova Scotia were only partially offset by increases in New York of 14%; in New Hampshire of 81% and Prince Edward Island 7%.

Among the principal varieties in all of these sections, the acreage of Cobblers was reduced 3% and Green Mountains 5%, while Spaulding Rose acreage increased 34%; Smooth Rurals 15% and Russets 24%. To date weather conditions have been quite favorable to a good yield of certified seed potatoes in most of the states and provinces.

In Maine, the outlook is for good yields although somewhat less than last year on the certified seed potato acreage. Last year, of 15,530 acres entered for certification, only 10,799 acres passed. Acreage decreases in Cobblers and Mountains are particularly noticeable. Spaulding Rose show only a slight increase.

New Hampshire shows a marked increase in the small acreage of Mountains planted for certification in that state. In Vermont Cobblers are increasing and Mountains decreasing. Weather conditions have been favorable to the crop in both of these states.

All varieties in New York show increases. Stand is good and a much better crop is expected than was harvested last year. Last year out of 2,629 acres entered for certification, 2,456 acres passed final inspection and similar results are expected this year.

Growing weather in New Brunswick has been ideal and a

large crop is expected. In 1929, 1,665 acres passed for certification out of a total of 2,850 acres entered.

From Nova Scotia it is reported that dry weather at planting time caused many misses and weak stands. The crop is expected to be light unless substantial rains are received soon. In 1929, 410 acres passed inspection out of 535 entered.

In Prince Edward Island, the season to date has been more or less dry and rain is needed to make a good set and an average crop. Prince Edward Island with 24,304 acres entered in 1930 continues to lead the northeastern states and provinces. Last year 22,641 acres were entered for certification of which 18,257 acres passed final inspection.

C. D. STEVENS,
G. BURMEISTER,
Statisticians.

Notes

NEW YORK

The Empire State Potato Club staged the largest potato tour ever held in this state, the attendance being 700 on Tuesday. On Wednesday, August 20th, there were approximately 4,000 potato growers at the potato field day and machinery demonstration at the farm of K. C. Livermore, Honeoye Falls, N. Y. Over twenty firms manufacturing potato machinery demonstrated approximately 80 modern machines. The demonstration was run off on the hourly time schedule, each operation from plowing to digging and grading being carried out in sequence. Electric amplifiers made it possible for this huge crowd to easily hear the four speakers during the noon hour program. These speakers and their subjects were: K. C. Livermore, Honeoye Falls, "Cutting Corners at Quaker Hill Farm"; Professor H. W. Riley, Cornell, "Engineering Problems of the Potato Grower"; Fred H. Bateman, Philadelphia, Pa., "Getting the Most Out of Our Potato Machinery" and Professor J. B. R. Dickey, State College, Pa., "Potato Fertilizer Experiments in Pennsylvania." C. H. Riley, President of the Empire State Potato Club, presided. It may well be said that this was an epochal event in the history of New York potato production and that it indicates the tremendous interest among potato growers in the question of power farming, and the application of modern mechanical devices in potato production.

—E. V. HARDENBURG.

CANADA

The Federal Bureau of Statistics states that the acreage planted to potatoes is 557,000 acres, an increase of 25% over the 1929 plantings of 543,727 acres. Saskatchewan reports a very slight decrease while all other provinces report slight to fairly heavy increases, with Prince Edward Island reporting the largest percentage increase, practically 6%. In the prairie Provinces, reports indicate that while the rainfall has been satisfactory to date, lack of rain from now until the end of August will seriously injure crop prospects. All other provinces report that growing conditions are good, with moisture sufficient. Conditions at the end of June indicate a crop considerably in excess of that of 1929. Spraying operations are holding pests under good control. The estimated acreage, by provinces for 1930 as compared with 1929, is as follows:

	Acres 1929	% of 1929	Acres 1930
Prince Edward Island.....	42,500	105.9	45,000
Nova Scotia	30,783	100.7	31,000
New Brunswick	45,215	103.9	47,000
Quebec	162,411	104.0	169,000
Ontario	148,435	101.0	150,000
Manitoba	30,436	101.1	31,000
Saskatchewan	41,637	98.4	41,000
Alberta	27,822	100.6	28,000
British Columbia	14,488	103.5	15,000

(Extract, Dominion Fruit Branch Report)

Preliminary reports show that approximately 34,000 acres have been entered for inspection with a view to certification in 1930, an increase of 1970 acres or 6% over the entries in 1929. The leading varieties are Irish Cobbler, 16,591 acres; Green Mountain, 13,883 acres; Smooth Rural, 1,078 acres and Bliss Triumph, 857 acres.

—J. T.

CONNECTICUT

The potato crop conditions here have been favorable on the whole. The drouth that hurt the early potato crop to some extent broke about the middle of May and during the following six weeks optimum weather conditions prevailed. The vines made excellent growth and very little disease or insect injury can be found. However, it has been dry since the first of July and unless we have abundant moisture soon it will hurt the crop seriously.

M. B. CHALKER.

MONTANA

Prospects in Montana for potatoes this year are not much brighter from the yield standpoint than they were last year. Dry land potatoes, at least in the eastern sections, are not looking wonderfully well. The Flathead, which is a dry district, is very much improved over last season and ought to be back to normal. Local prices on potatoes are decidedly in excess of national prices and it looks as though our growers will have a very good home market again this year.

—F. M. HARRINGTON.

MICHIGAN

Severe drought in July cut more than 3,000,000 bushels from the prospective potato crop in Michigan this year. Continuation of the bone-dry weather in August will no doubt cut production below the 26,037,000 bushel estimate of August 1. The condition of the crop August 1 was 14% below the 10-year average.

Drought and heat has been more intense in southern Michigan. In some of the northern counties more favorable weather may result in moderate to good yields.

A heavy cut has been made in the acreage listed for inspection this year. Approximately 3,000 acres are under inspection this season compared with approximately 5,800 acres inspected for certification in 1929. The condition of certified fields is quite good despite continued drought. Early and thorough preparation of the seed bed and frequent applications of bordeaux mixture have proven beneficial factors in keeping the plants green.

—H. C. M.

MINNESOTA

The Ninth Annual Potato Tour

Several things impressed those who shared in the Ninth Annual Potato Tour in Minnesota, July 29-31, sponsored by the agricultural extension division of the University of Minnesota and by the Minnesota State Department of Agriculture. Among these things were:

The progress made by Dr. F. A. Krantz, potato specialist of the division of horticulture, University of Minnesota, in breeding improved varieties of potatoes which are likely to replace some of the present standard varieties.

The progress made by Minnesota growers in machine production—the use of labor-saving equipment from the preparation of the soil to harvesting and marketing.

The growth of the seed certification business, under the direction of A. G. Tolaas for the State Department of Agriculture.

The successful battle being waged by growers against both plant diseases and insect pests.

The tourists, representing a great variety of interests related to the potato industry, got their first real sight of Dr. Krantz's new potatoes at University Farm, St. Paul. There, for example, they saw some of the new varieties growing alongside of Irish Cobblers. Dr. Krantz pulled up several hills of his new potatoes and several of Irish Cobblers. In every instance, the new potatoes outdid the Cobblers in appearance, shallowness of eyes, and yield. The yield per hill in every case ran from twice to two and a half times that of the Cobblers. From the evidence of the vines, it was plain that in earliness the new potatoes were ten days ahead of the Cobblers. The visitors were tremendously interested and expressed their enthusiasm for the new creations.

In addition to University Farm, the tour covered the Hollandale and Kansota projects in the southern part of the state; the potato fields of growers in Hennepin, Anoka, and Mille Lacs counties, Hennepin county being the domain of Minneapolis, and the other two counties lying just to the northward; the University's experimental fields at Coon Creek in Anoka county, where problems of sandy soils on the one hand and peat soils on the other are being tried out, and Polk county in the Red River Valley, where the university has an experiment station at Crookston.

At Hollandale and Kansota the tourists saw large peat projects, where hundreds of acres of potatoes are grown from year to year, many for seed certification, by up-to-date methods. In Hennepin county they saw potatoes being harvested by a new "potato combine," which digs, sorts and sacks in one operation. At the University's Cook Creek experimental fields, they saw potatoes growing on peat in close formation, the rows two feet apart and the potatoes only a foot apart in the rows. This close formation, together with fertilizing, it was said, seemed to give protection against frosts, which are the bane of the peatland potato farmer. Near Princeton in Mille Lacs county they saw a peat area of about 2,000 acres being turned into a bonanza potato farm, with some 500 acres in splendid looking potatoes coming on this season. The project is that of Odin Odegard of Princeton. Mr. Odegard had his array of plows, rollers, cultipackers, tuberunit planters, sprayers (spray and dust), and diggers, all lined up for inspection. An interesting demonstration here was

the effects of the use of sodium chlorate in eradicating quack grass.

In the Red River Valley the tourists got another glimpse of Dr. Krantz's new potatoes, being tried out under valley conditions. They visited half a score of farms where growers are co-operating in testing the use of compounds for seed treatment, in spraying, in growing different varieties of early seed for the southern market, and in battling with disease.

The tour was under the direction of Mr. Tolaas and of R. C. Rose, plant disease specialist of the extension division of the Minnesota College of Agriculture.

—W. P. KIRKWOOD.

MINNESOTA

The month of July has been anything but desirable for the welfare of the Minnesota potato crop. Northeastern Minnesota has had enough precipitation to take care of present needs but that part of the state extending from the Twin Cities to the northwest corner of the state, embracing the entire Red River Valley, is feeling the effect of the prolonged hot dry spell. The fields in Kittson county and in western Polk county seem to have had enough moisture up to the present so that little or no reduction in yields will occur if several good rains come during the months of August. However, in the southern part of the valley the extreme heat and drouth have undoubtedly caused considerable damage, many of the fields already having begun to dry up. Inasmuch as this region produces a large percentage of our main potato crop, subsequent crop estimates will no doubt be considerably reduced.

Growers in the early section adjacent to the Twin Cities report 30 to 50% yields less than was produced in this same region in 1929. Many of the fields show plants completely dried up while in others they are rapidly turning brown, at least two weeks earlier than they should.

The acreage being inspected for certification is also materially lower than that of 1929, approximately 4,000 acres being listed for inspection. We have just completed our first field inspection and the inspection reports indicate that as far as diseases are concerned, the fields are in good shape. More than half of these fields are being grown on peat, and in the Kittson and West Polk county areas where sufficient moisture has prevented any serious loss from the heat, with continued moisture and less heat from now on these sections should produce some fine seed stock.

—A. G. TOLAAS.

Fitch, C. L. More Potatoes per Acre. Iowa State College Agricultural and Mechanical Arts. Extension Service Bulletin 128 (revised) 23 p. April 1930.

This bulletin is well illustrated with 28 figures. The author's summary of this bulletin on page 2 tersely expresses the factors necessary to the production of a large crop. These are as follows: Selected soil; right rotation; high fertility; good drainage; surface drainage; best seed and variety; plenty of seed; seed disinfection; planting at right time; good cultivation; good spraying; protection from run-in water on peat and muck soils; saving tubers from bruises; early selling in most years; summer storage by home folks. The subject matter of the bulletin is divided into six major parts: 1. The ground; 2. The seed; 3. The growing; 4. Sale and storage; 5. Iowa as a potato state; 6. How to secure guidance in potato culture.

The publication as a whole is attractive and the subject matter concise and interesting.

—W. STUART.

ANNOUNCEMENT

of the

ANNUAL MEETING

of the

POTATO ASSOCIATION OF AMERICA

to be held at

Cleveland, Ohio

December 29-30-31, 1930

An excellent program is being planned that will be of real interest to growers, dealers and workers in research and extension problems.

Papers to be read at the Annual Meeting are solicited at this time. Please send the title of paper to the Secretary.

See the November Journal for Final Program.

PLENTY OF POTASH makes POTATOES PAY

AGRICULTURAL AND SCIENTIFIC BUREAU
N.Y. POTASH EXPORT MY.
OF AMSTERDAM, HOLLAND

19 West 44th Street
NEW YORK

Buckingham Bldg.
CHICAGO ILL.

Eureka Potato Machines

Make Money for Potato Growers

Eureka Potato Machines take hard work out of potato growing. They reduce time and labor costs. They assure bigger yields.

Potato Cutter

Cuts uniform seed. Operates with both hands free for feeding.

Potato Planter

One man machines doing five operations in one. Over twenty-two years' success.

Traction Sprayer

Insures the crop. Sizes, 4 or 6 rows, 60 to 100 gallon tanks. Many styles of booms.

Riding Mulcher

Breaks crusts, mulches soil, and kills weeds when potato crop is young and tender. 8, 10 and 12 ft. sizes. Many other uses, with or without seeding attachment.

Potato Digger

Famous for getting all the potatoes, separating and standing hard use. With or without engine attachment or tractor attachment.

All machines in stock near you. Send for complete catalogue



POTATO CUTTER



POTATO PLANTER



POTATO DIGGER



TRACTION SPRAYER



RIDING MULCHER

Many
Successful
Potato
Growers
use Eureka
Two-Row
Fertilizer
Distributors
and
Eureka
Two-Row
Potato
Planters

EUREKA MOWER CO.

Utica, N. Y.